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ABSTRACT

The United States will not be competitive in the global economy of the 21st century without a technically trained work force. Community colleges and secondary schools offering technical programs are becoming increasingly important to local businesses as companies rely on a combination of schools and on-the-job training to help their employees develop needed qualifying skills. The benefits of technical education have been proved in studies confirming the high performance rates of technical education students and the high wages of vocational-technical school graduates versus those of their nontechnical education counterparts. Bias against vocational training in public schools still persists, however. Promising innovations, including advanced learning technologies, partnerships with industry, and youth apprenticeship programs, are helping to strengthen technical education in the schools. Technical education for a highly skilled work force currently represents only a small fraction of the total higher education budget. The time has come for a fundamental federal policy shift that includes the following: changing priorities to emphasize human resources development, strengthening partnerships with industry, fostering continuous quality improvements in technical education, easing the school-to-work transition, strengthening both first- and second-chance programs for disadvantaged persons, and recognizing achievement and bolstering student organizations. (Contains 60 references.) (MN)

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ED 360 497

NACFAM

PREPARING TECHNICAL WORKERS FOR THE NEW INDUSTRIAL ERA:

THE NEED FOR A FUNDAMENTAL SHIFT IN FEDERAL POLICY TOWARD TECHNICAL EDUCATION

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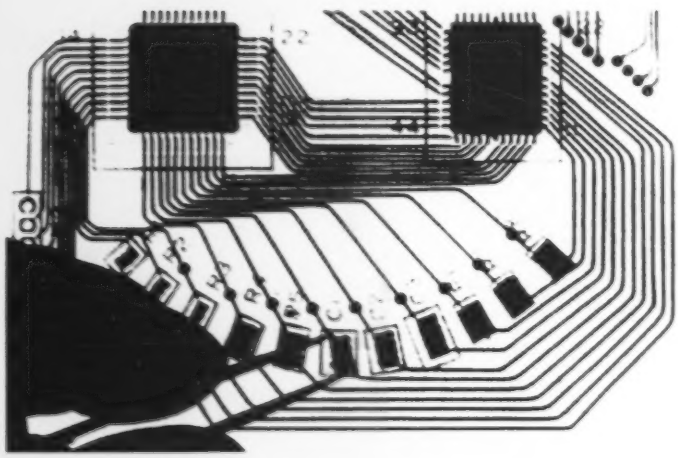

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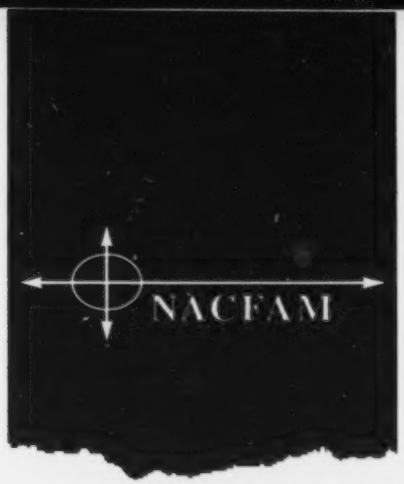

PREPARING TECHNICAL WORKERS FOR THE NEW INDUSTRIAL ERA:

THE NEED FOR A FUNDAMENTAL SHIFT IN FEDERAL POLICY TOWARD TECHNICAL EDUCATION

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NATIONAL COALITION FOR ADVANCED MANUFACTURING

■ POSITION PAPER ■

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ACKNOWLEDGEMENTS

NACFAM has consistently viewed a highly skilled technical workforce as an integral requirement of any meaningful national effort to increase the global economic competitiveness of America's industrial base. In the summer of 1992, we began a methodical effort, through the development of a NACFAM position paper, to analyze the federal role in preparing technical workers for the new industrial era marked by the widespread use of advanced, computer-based technologies.

In the drafting of this paper, we became increasingly convinced that current federal efforts in this field were seriously wanting. Looking at this issue from the joint perspective of both industry and the technical education community, NACFAM has taken the position that, if the federal government wishes to become a serious player in the field of technical education, nothing less than a fundamental shift in federal education policies, programs, and resources will be required. This position paper lays out the rationale for this conclusion and recommends a series of changes in federal policy.

In preparing this position paper, NACFAM worked with a core group of experts in technical education. We also circulated successive drafts to individuals in industry, education, labor and government. Sally O'Dowd, NACFAM's Director of Education Policy and Programs, is the individual primarily responsible for organizing committee work, conducting research, and drafting this position paper.

Throughout the drafting process, NACFAM consulted with more than 100 individuals and its membership of nearly 300 organizations. We reviewed all comments that were sent to us, and found many of them to be especially insightful. NACFAM wishes, in particular, to thank the following individuals for their thoughtful comments and contributions to this position paper.

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NOTE

The National Coalition for Advanced Manufacturing (NACFAM) is a non-profit, non-partisan coalition of manufacturing companies, national trade and technical education associations, and centers of manufacturing technology extension, education, and research. NACFAM seeks a public policy environment more supportive of advanced manufacturing and industrial modernization as keys to America's global economic competitiveness.

NACFAM position papers are intended to reflect a broad cross-section of views among the members of the coalition. All NACFAM member organizations have an opportunity to comment on position papers in the drafting stage, and the NACFAM staff works to accommodate and resolve differing views. The views expressed herein should not be ascribed to any specific NACFAM member, as the final version of position papers is the responsibility of the President of NACFAM.

SECTION 1

EXECUTIVE SUMMARY

Executive Summary

To be globally competitive, U.S. industry has an acute and growing need for highly skilled technicians—the area of greatest occupational growth into the next century.

From industry's perspective, the nation's school system is inadequately preparing students for technically demanding occupations, especially as the nation's industries move to adopt advanced manufacturing technologies. As companies modernize to become more competitive, industry needs schools that are also modernizing to educate a more competitive workforce.

To meet this challenge, schools will need to meet industry needs by graduating a larger percentage of students who possess the technological literacy necessary to adapt to emerging technologies, and who are able to integrate and apply technical skills, related academic competencies, and employability skills in high-performance work settings. The most efficient, cost-effective way to increase this percentage is not to burden industry with basic and remedial education responsibilities but to improve and strengthen technical education within secondary and two-year postsecondary schools.

Yet it is precisely in its support for these schools that federal education policy is the weakest. Although technical occupations will grow 33 percent from 1990 to 2005, the federal government has cut funds for vocational-technical education by 13 percent since 1980. Only a small fraction of the total $68.4 billion federal education budget, primarily the $1.2 billion Carl D. Perkins Act, is currently going to vocational-technical education programs.

Since the 1960s, the federal government has targeted almost all of its resources in this field on discrete population groups, leaving it to state and local governments to provide technical education and training for the population as a whole. While programs for the educationally and economically disadvantaged must be strengthened and expanded to serve more people, federal funds must also be increased to provide more technical education programs for the general population. Increasing technical career opportunities for all youth, while improving the quality of technical instruction, would add to the stature of federal initiatives in this area.

Although the Clinton Administration has proclaimed the need to give higher priority to workforce skills development, in reality, the Administration's FY 94 budget proposal provides for only a slight increase in federal funds for technical education. Even with the proposed four-year $1.2 billion youth apprenticeship program, the Clinton Administration's proposals for technical education are clearly inadequate if the federal government wishes to play a significant role in enhancing the capability of the nation's schools to educate and train a high-skills, high-wage workforce.

Key Recommendations for Federal Policy

1. In our view, the most effective way for the Clinton Administration and the U.S. Congress to contribute to the development of a high-skills workforce is to *make a fundamental change in priorities in order to establish global economic competitiveness and quality technical education as the principal drivers* of federal education resources, policy, and programs.

2. To effect this change in priorities, the federal government should substantially *increase its support for improvements in technical education within secondary and two-year postsecondary schools*. These schools should be the primary resource for developing school-to-work transition programs—such as youth apprenticeships and Tech-Prep—and for bringing educationally and economically disadvantaged groups up to the skill level needed for employment in industry. At the same time, technical education programs in the nation's schools

should be evaluated on a regular basis to avoid duplicative services and identify best practices.

3. Drawing upon funds the Clinton Administration has identified for long-term investment in education, the federal government should, for example, double its budget for vocational-technical education and other youth training programs over the next four years as follows:

- **From $1.2 billion in FY 93 to $6 billion by FY 97 for technical education programs.**
- **From $5.2 billion in FY 93 to $6 billion by FY 97 for job training programs for the educationally and economically disadvantaged.**

4. *This additional funding should be made available for programs such as the following:*

- **Joint proposals submitted to state governments by committees of industry representatives, labor leaders, and educators** for various kinds of cooperative efforts to serve technical workforce needs, including projects that receive initial funding from industry for which the federal government supplies a match.
- Development of **comprehensive programs and curricula integrating academic and technical courses,** including greater use of applied learning methods.
- **Expansion of Tech-Prep,** a successful four-year program integrating two years of secondary technical education and two years of postsecondary education, from $104 million in FY 93 to $1 billion by FY 97.
- **Program improvements** in technical education including professional development of teachers, career exploration and mentor programs for students, systems to assess school performance and job placement rates, and management-technical assistance to help schools modernize.
- Funding of the federal portion of **youth apprenticeship programs** at the level proposed by the President ($1.2 billion over four years), drawing upon labor's experience in the development of these programs. Youth apprenticeships must adhere to clearly defined occupational and educational standards, follow guidelines set by industry and labor, and provide school-based curricula to complement work-site training.

5. *Other initiatives that the federal government should consider* as a means to improve technical education include the following:

- **Tax incentives to businesses** to encourage their full participation in the effort to improve technical education, by, for example, donating equipment to schools or leasing it at below market rates.
- Continuing development of voluntary **skill standards** and certification requirements in industrial occupations using national boards proposed by the Clinton Administration, **as long as industry plays the lead role** in determining these standards.
- **Total integration of instruction in employability and high- performance skills**, into technical education. **Vocational-industrial student organizations should be used** as a means to inculcate these skills.
- **Enhancement of the prestige of technical careers in industry** and a system of awards and recognitions up to the Presidential level for achievement in technical education.

6. All of these programs and initiatives should be *subject to strict standards of accountability*, including the responsibility of technical educators to help students find employment and track job placement rates.

While the authors of this paper fully realize the importance of educational improvements at all levels, this position paper focuses on secondary schools preparing high school students for work and on community and technical colleges offering programs for both students and workers. It does not encompass the $30 billion or more in training programs offered by companies and unions themselves for employees,[1] although it does acknowledge that many companies use schools for worker training or re-training.

In addressing the urgent need to improve America's technical education system to develop a highly skilled workforce for an intensely competitive global economy, this paper:

section 2 • explains the need for a technically trained workforce to meet the competitiveness challenge

section 3 • describes the current infrastructure for technical education

section 4 • assesses the strengths and weaknesses of that infrastructure

section 5 • discusses prospective innovations to strengthen technical education in schools

section 6 • explains how federal funds are now invested

section 7 • calls for a major shift in federal education policy in favor of technical education and recommends a series of measures to effect that shift.

SECTION 2

The Need for a Technically Trained Workforce

"The classroom will be the battle ground for the nation's global economic competitiveness in the 21st century."

The Need for a Technically Trained Workforce

America's competitiveness in the global marketplace rests upon the country's ability to produce high-quality, high-value-added goods and services, delivered on time and at reasonable cost to meet ever-changing customer needs. Multiple factors contribute to the nation's ability to meet this challenge: technology, management, capital, production and design, marketing, transportation, government and trade policies, etc.

No factor is more central to competitiveness than the human skills involved in creating those goods and services. Indeed, the classroom will be the battle ground for the nation's global economic competitiveness in the 21st century. "While technology creates man-made comparative advantage, seizing that man-made comparative advantage requires a work force skilled from top to bottom," writes MIT economist Lester Thurow.[2] This is especially true in the new high-tech era marked by such emerging industries as microelectronics, biotechnology, composite materials, advanced telecommunications, robotics, and computer integration. "All are brainpower industries," Thurow writes. "Each could be located anywhere on the face of the globe. Where they will be located depends upon who can organize the brainpower to capture them."[3]

Sharing in this view is Secretary of Labor Robert Reich, who argues in *The Work of Nations* that the economic well-being of Americans depends "on the value they add to the global economy through their skills and insights." He notes, "Increasingly, it is the jobs that Americans do, rather than the success of abstract entities like corporations, industries, or national economies, that determine their standard of living."[4]

America's need for a high-skills workforce is especially evident in the new manufacturing environment marked by the growing use of computer-based machine tools, statistical process control, flexible manufacturing systems, just-in-time inventory control, and other advanced production technologies. Workers in modern, high-performance work organizations need to be prepared for more direct involvement in managing the production process. As articulated in the *National Defense Manufacturing Technology Plan* issued by the Department of Defense in April 1992:

> "Flatter hierarchies and distributed authority will push more responsibility down to the factory floor. Workers will have to maintain production while analyzing problems and implementing their own solutions. The obvious implication of these changes is the requirement for higher knowledge and greater skills."[5]

In response to these evolving technologies and changes in workplace organization, industry has an acute need for skilled technical workers. While jobs in most occupations will grow on average by only 20 percent between 1990 and 2005, the U.S. Department of Labor, Bureau of Labor Statistics, predicts that employment in five major technical fields, such as computer programming, health, engineering, "science- and math-related", and drafting, will increase on average by 33 percent from 1990 to 2005—from 3.7 million jobs to 5.1 million jobs. [6]

The skills of the American workforce are also crucial to the success of the nation's technology policy. In its 1993 report, "Mastering a New Role: Shaping Technology Policy for National Economic Performance," the National Academy of Engineering recommends that the federal government:

> "Support experimentation with a wide range of public and private initiatives at the federal, state, and local levels to increase the quantity and improve the quality of school-to-work transition programs and of job-related training and continuing education for the nation's non-supervisory work force."[7]

Industry leaders are skeptical about the ability of the nation's education and training institutions to provide an adequate flow of workers capable of filling these more demanding occupations. In its 1992 *Workforce Readiness* report, the National Association of Manufacturers concluded from a series of focus groups that "All CEO groups realized that they would have to bear the costs of remedial education and training as part of doing business in the U.S. And most recognized the need for CEO/business advocacy in the community for education reform. All groups felt that unless something radical is done, the schools will continue to fail to produce educated, employable workers."[8]

In response to this finding, the NAM's President, Jerry Jasinowski, affirms that young Americans on average reach lower academic achievement levels than those in many other industrialized countries and that America is investing insufficiently in frontline workers. "Our major trade competitors provide more and higher quality worker training and basic education than the U.S," he writes in the NAM report.

In addition to rectifying this disparity, the nation must address its own domestic needs for worker training, Jasinowski concludes. "Changing demographics—fewer entrants into the work force, an aging population, increased immigration, growing ethnic and cultural diversity—combined with the increased complexity of the workplace have made training and education of all American workers a critical necessity."[9]

These are just some of the reasons why every high-level study of U.S. global competitiveness emphasizes the importance of improving the quality of the nation's schools to help develop a technically trained, highly skilled workforce.

In the Progressive Policy Institute's *Mandate for Change*, for example, the authors write:

> "President Clinton must move to ensure that U.S. firms have access to the best-trained work force in the world. America does a brilliant job of preparing the top 20 to 25 percent of our work force, the people we rely on to invent new products and organize better processes for producing them. But when it comes to the next 75 percent of our men and women, who do not graduate from universities, and upon whose skills America's ability to produce high-productivity goods and services depends, we have fallen behind the competition. Like an army without trained troops, U.S. firms cannot expect to become productivity leaders in their industries without the frontline workers to operate the new production system with its increasingly advanced technology."[10]

The nation must therefore follow through on its commitment to improve the skills of American workers, a commitment established at the 1989 "Education Summit" in Charlottesville, which was led by President Bush and then Governor Clinton. One of the national goals established at the summit, attended by the governors of all 50 states, was to "guarantee an internationally competitive standard [in] the level of training necessary to guarantee a competitive work force."

That is a tough guarantee to make, given the current status of America's worker training programs. According to the recent Strengthening of America Commission Report:

> "If we were to *design* a system guaranteed to produce a declining standard of living, it could not be any more brutally effective than the process we already have to prepare our people for work... "Unlike our competitors, the United States has ***no system*** (emphasis added) to assist the transition from school to the workplace or to educate and train its front-line workers. Such a system was not necessary for a mass production that demanded little of its front-line workers, but the information and technology revolution, which requires constant modification and improvement in products and services, has changed the situation."[11]

To ensure its competitive advantage, the United States must invest more heavily in technical education programs. Yet it is misleading to conclude that "no system" exists for this purpose. Technical education in secondary and two-year postsecondary schools provides resources and facilities with the potential for preparing students for work. In its pursuit of a globally competitive workforce, the federal government should focus on improving these schools, rather than creating alternative programs outside of the school system.

Nevertheless, an increased federal role in technical education is not enough. Industry leaders must also become more involved in education to ensure that schools become more accountable for preparing students to perform successfully in the technical and high-performance workplace. According to *Mandate for Change*, industry may be involved in curricula development but executives seldom play an active role in the "teaching and learning process." "The result is that few high-productivity firms look to high school vocational education programs to fill shortfalls of skilled workers; 60 percent of young people educated in such programs do not find their way into the occupations for which they were trained."[12] To remedy this situation, industry, labor and government must all work with educators to strengthen technical education in the nation's schools.

SECTION 3

The Infrastructure for Technical Education

"Community colleges and secondary schools are particularly important to local businesses, as companies rely on a combination of schools and on-the-job training to impart qualifying skills to their employees."

The Infrastructure for Technical Education

For the purpose of this paper, the infrastructure for "technical education" refers principally to programs in the last two years of secondary school and the first two years of postsecondary school that lead to the development of skills needed for technical occupations in industry.

At the high school level, thousands of facilities around the country offer vocational education classes which impart basic technical and employability skills. Approximately 16,000 general and comprehensive high schools offer vocational classes on a small scale, while 225 vocational high schools offer both complete academic and vocational programs. About 1,900 area vocational training centers cater specifically to technical training needs. Students enrolled in technical programs at these centers supplement their coursework with classes at general high schools.

Over 3 million high school juniors and seniors take classes at these schools.[13] In 1987, 54.6 percent (1.5 million) of all graduating high school seniors took four or more Carnegie units of vocational education. The most popular courses were business classes, followed by courses on communications systems, industrial technologies, and specific trades.[14]

At the postsecondary level, the nation's 1,200 community, technical and two-year colleges enroll 6 million students for credit-based courses and 5 million students for non-credit-based courses. This represents the largest segment of higher education in America. In the most recent data on associate degree recipients (1989), community colleges graduated 254,314 students in occupational programs and another 194,683 students in academic transfer programs. Community colleges also serve as training sites for adult workers seeking retraining.

University transfer, occupational training, and customized training are three missions of community, technical, and two-year colleges. Educating a diverse population is also a mission. For example, 1991 data indicate that 58 percent of the community college enrollment is female. In terms of higher education as a whole, community colleges enroll 37 percent of all white students in higher education, 42 percent of African Americans, 54 percent of Hispanic Americans, 38 percent of Asian-Pacific students, and 52 percent of American Indians.[15] In this sense, community colleges are responding to the demographic changes in the population. This is especially significant, given that 53 percent of the net new workers in the United States between 1988-2000 will be members of three minority groups: African American, Hispanic American and Asian American.[16]

Community colleges and secondary institutions are particularly important to local businesses, as companies rely on a combination of schools and on-the-job training to impart qualifying skills to their employees.[17] Small business is especially dependent upon technical education in schools for worker training. A 1989 study by the Small Business Administration, "Training Small Business Offers and Training It Does Not," shows that in businesses employing fewer than 24 people, 42 percent of the employees cited vocational-technical institutions as the source of their most recent training. In firms employing between 250-500 people, the percentage was 34.5 percent.

"Measures to improve school-to-work transition programs should take place in high schools and community and technical colleges. However, we have no objection to fundamental changes within the school system to ensure that schools are responsive to the practical needs of industry."

SECTION 4
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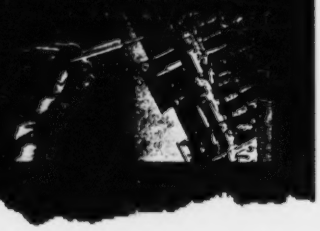
Strengths and Weaknesses



Strengths and Weaknesses of Current Technical Education Infrastructure

In April, 1993, Secretary of Labor Robert Reich stated that the Clinton Administration would "continue to use the secondary education system to assist our youth in mastering the skills that are common to all high skilled work."[18] But, he added, funding for vocational education must be "frozen" pending an evaluation of programs.[19]

These statements echo the ongoing debate over the role of technical education in the nation's schools in preparing students for work. In arguing for improving school programs, this paper recognizes that all schools are not fully capable of meeting industry's needs, while the school system itself has some systemic weaknesses that must be addressed. Let us consider both the strengths and weaknesses of technical education in America's schools.

Strengths

Technical education in secondary and two-year postsecondary schools has made significant efforts in the last 10 years to become more relevant to the needs of industry. Technical educators are assisting industry associations in the creation of national voluntary skill standards administered through grants by the Education and Labor Departments. They were also the leading proponents behind the drive for industry-recognized standards for occupational education, implemented in all states in September, 1992.

At the state level, technology education programs, which emphasize computer literacy and analytical skills, are becoming integral to school curricula. In Maryland, all high school students will be required next year to take at least one technology education course to graduate. Virginia's Department of Education has also announced that by next year technology education will replace industrial arts classes.[20] In several states, technical committees of industry leaders often oversee curricula development. Locally, schools are required by law to work with business advisory committees to assure that all programs meet local employer needs.

Furthermore, technical education leaders during the last four years have worked to develop partnerships with employers by creating pre-apprenticeship opportunities and student-employer contracts. The states of Arkansas, Maine, Massachusetts, Michigan, Oregon and Wisconsin, for example, are transforming their cooperative education programs, in which students study part time and work part time, into more extensive pre-apprenticeship programs.

Vocational student organizations (VSOs) at the secondary level have also established business-education partnerships serving the respective needs of students and employers. By providing students real work experience, VSO activities instill in students the workplace basics needed in industry and recommended by the 1992 report by the Secretary's Commission on Achieving Necessary Skills (SCANS). Woven into curricula, VSO activities teach skills that are essential for career success: teamwork, leadership, goal setting, and management. VSO programs build participant self esteem; involve students in community service; and test students' occupational skills based on industry-recognized standards in local, state, national, and international competitions.

Technical Preparation (Tech–Prep)

Educators in two-year community and technical colleges and secondary schools have worked together to design four-year Tech-Prep programs, funded through the 1990 reauthorization of the Perkins Act. These programs offer technical training in the last two years of high school fol-

lowed by instruction at two-year community and technical colleges. The secondary and postsecondary levels are fully coordinated to enable students to work toward an advanced associate's degree once they enter the eleventh grade. Modestly funded at $104 million in FY 93, this program has received positive remarks from businesses and educators around the country.

Schools such as Chopticon High School in Morganza, Maryland—where the principal attributes improved student performance to Tech Prep and Maryland's own school improvement plans—explain why:

- The drop out rate decreased from 32 percent during the 1988-89 school year to 1.4 percent for the 1992-1993 school year.
- The pass rate for first-time test takers of the Maryland functional math achievement test increased from a mean of 65 percent in 1988-89 to 84 percent in 1992-93.
- The pass rate on the writing test increased from an average of 75 percent to 96 percent, while the pass rate in social studies increased from 60 percent to 86 percent during the same period.

Applied and Experiential Learning

In addition, technical education has developed an asset which, if supported and encouraged, can raise the overall education level of vast numbers of Americans: the applied learning method.

State vocational leaders have developed applied academic courses—in physics, biology, chemistry, mathematics, and communications—which combine hands-on learning with theoretical principles that are necessary to understand advanced emerging technologies. Thousands of localities in 47 states now offer a combination of courses that strengthen academic, theoretical, occupational and employability skills to prepare students to succeed on the job.

Cognitive science has proven that 75 percent of the population learns more quickly, and retains more material, if taught using the applied learning method.[21] As stated in the recent study, *The Double Helix of Education and the Economy*, by Sue E. Berryman and Thomas R. Bailey:

> "[traditional] education and training misses the point that human beings are inquisitive, sense-making animals who learn best when they are fully and actively engaged in solving problems that mean something to them. Because it violates the way that people learn most effectively, our current approach to education and training simply does not work."[22]

Curricula designed to address this problem integrate high-level academic courses with applied technical education so that students develop a holistic set of skills. All work is now technical in one form or another, requiring all workers to be technologically literate. To meet the demands of the modern workplace, students must be able to demonstrate advanced computer skills, and be able to apply math, science and technology concepts. This is especially true for employment in industrial firms.

Putting applied technical education into a social context, the Rindge Institute of Technical Arts in Cambridge, Mass., provides an interesting example of integrated learning. During their freshman year, students participate in the "Cityworks" program, which teaches students about city government and economic, demographic, and social conditions.

For example, a group of students interested in learning how to open a restaurant must investigate the city's zoning, health, and safety codes, and fill out the proper permits required of new businesses. To fulfill the technical requirements of the program, the students construct both a small-scale model of the entire restaurant and also a real-life sized model of the dining room. Students in the Cityworks program also give multimedia, videotaped presentations and take photographs for use as visual aides, with cameras donated by Polaroid. As students become more engaged in their projects, teachers lecture less frequently. They become more like coaches, assisting students as they solve problems for themselves.

The sophomore year focuses on the industries in the city and the types of jobs available. During the 1992-93 school year, sophomores in an automotive class studied how to convert gas cars into electric cars, completely stripping and then rebuilding a used truck. This experience has prepared them for the 11th and 12 grades, known as the Senior Institute. During the last two years of high school, students work as apprentices in local businesses, volunteer as teacher aides, or run school-based, for-profit enterprises. During the 1993-94 school year, the automotive class will work on starting a gas-to-electric car-conversion business,

with help from Harvard University, the city, and the state. This comprehensive method of teaching fully integrates academic and technical courses while it fosters interactive and experiential learning. Students apply what they have learned from one level to the next, gradually preparing themselves for work. This steady progression helps them appreciate the relevance of school to employment.

Student Outcomes

The high performance rates of students taking applied technical courses are proof of the merits of such programs. According to the Council of Chief State School Officers, vocational-technical schools "have out-performed regular high schools on indicators such as rates of graduation, percentage of students taking the SAT, average combined SAT scores, and percentage of minority students scoring above their racial group mean." Since these schools also have special relationships with industry, they provide "cooperative education experiences in a range of industrial settings previously inaccessible."[23]

Moreover, a recent study in Ohio shows that technical education graduates earn higher wages than people of the same age with the same years of schooling, but who have not attended vocational-technical schools. Economist I.A. Ghazalah tracked 13,109 graduates of vocational high schools and about 1,600 with associate's degrees from Ohio community colleges. He concluded that four to seven years after graduation in 1979, these students outearned their non-tech-ed counterparts by 20 percent to 90 percent.[24]

A second study conducted at Penn State in 1992 affirms that technical skills may lead to higher wages. Calculating the average 1986 earnings of 3,309 1972 high school graduates,[25] the authors of the study concluded that a "four-year college degree adds just 6 percent to a high school graduate's annual income—an average of $1,243—while a vocational-technical high school diploma adds $1,036." In the words of associate professor Kenneth Gray, "...the return on a four-year college degree is $207."

Weaknesses

Despite the strengths and improvements in technical education at the nation's secondary and two-year postsecondary schools, many initiatives are set back by an inherent bias in the public school system against vocational training. Technical education is at a disadvantage because policy makers and the education establishment itself hold a well-documented bias in favor of the "college bound." Most national policy makers have had little or no direct experience in technical education. Because technical education is not the core objective of the traditional K-12 system, it is often viewed as an "add on."

This bias shows up in the lack of federal support for programs to train a highly skilled workforce. For example, for every dollar in tax revenue invested in the subsidizing of the non-college bound, fifty-five dollars is spent subsidizing college students.[26]

Moreover, educators in non-technical fields have viewed their responsibility as "education for life," focusing on liberal arts while neglecting the value of technical skills. Although major education policy commissions have stated for decades that preparation for work is a cardinal objective of public education, the public school system has not centered its curricula around this goal.

Compounding this problem, many four-year postsecondary institutions strengthen the bias against technical education. In some states, "applied academic" courses required to graduate from vocational-technical schools are not accepted as prerequisites by four-year colleges and universities.

Some educators hold a bias against technical education citing fundamental weaknesses that they believe detract from its ability to serve industry needs. Critics often argue that:

- There is no secondary technical education "system," but a wide diversity of programs without common goals or standards.
- Students do not move from high school to community colleges within a system of classes sequenced according to employer needs.
- Technical education is characterized by enormous overbuilding, large amounts of underused and outdated equipment, and staff with little or no direct knowledge of industry.
- Vocational-technical schools use complex internal codes and regulations without serious performance measures. Educators do not focus sufficiently on learning processes and student performance.
- Staff at vocational-technical schools are rarely well-informed about industry needs and technological innovations.

- Employers have very limited actual influence on school curricula, thus schools do not respond adequately to employer needs.

- Many trade associations and private companies have founded their own schools (such as Detroit's Henry Ford Trades School) precisely because they did not believe the local technical education system was adequate.

The need to address the problems associated with technical education in the nation's schools is becoming more urgent, precisely because the school system is being held more accountable for preparing students for work. The Council of Chief State School Officers recommended in November, 1991, the elimination of the "general track", the sum of high school courses that offers neither adequate college-preparatory instruction nor occupational training to the 55 percent of high school students described as "the forgotten half" that is "milling around" the public school system. The Council also stresses that:

> "Every student should participate in a program that guarantees access to postsecondary education, training, and employment. Programs of general studies that do not produce high rates of graduation with promise for continued education or employment must be replaced with programs that prepare young people for continued education and employment in high-performance workplaces."[27]

While some of those who are disillusioned by technical education programs in the nation's schools believe that the federal government should provide funding for joint public-private efforts outside the school system, we argue that measures to develop and improve school-to-work transition programs should take place at high schools and community and technical colleges. Given fiscal budget constraints, it is not in the nation's best interests to create alternative programs outside the existing school structure, such as a "13th year" of school once proposed by Labor Secretary Reich. As the recommendations in this paper suggest, we have no objection to fundamental changes within the school system itself to ensure that schools are responsive to the practical needs of industry.

"Policy makers are reminded to evaluate existing programs, fund only those that show merit, and seek innovation when new programs and services are needed."

SECTION 5

Seeking Innovation

Seeking Innovation: Schools for the Present, for the Future

One major area of improvement would be for the schools to accelerate their adoption of major innovations, such as advanced learning technologies, expanded partnerships with industry, and youth apprenticeships.

Advanced Learning Technologies

Just as the military and business use new technologies for training purposes, schools should introduce young students to computers and technology as preparation for work in the real world. This exposure is especially critical for workers beginning their careers in the new industrial era, in which technology enhances the problem solving abilities of skilled workers but often replaces workers who are unskilled.

Computer-based tutorials, electronic networks, telecommunications systems, databases, graphic design and publishing software, videodisc, CD-ROM, multimedia encyclopedias, and interactive and satellite television are all technologies that could dramatically improve teaching and learning.[28] These systems are already being used in classrooms around the country. The benefits of their use include: higher quality instruction and motivated, self-paced students; relevance to the modern workplace environment; enhanced capabilities for individualized learning; greater achievement levels in algebra, geometry, calculus, and applied math; and the development of analytical, problem solving, computer-programming, and database entry skills.

Yet the presence of technology in classrooms alone will not improve students' capacity to learn and succeed on the job. Indeed, once schools acquire technology, they will find that the "challenge is to engage students in skillful use of these tools as learning resources."[29] To make full use of these technological investments, teachers must receive frequent retraining on advanced equipment and processes. Secondly, just as students must meet skill standards, so must teachers meet teaching standards. Thirdly, investments in technology must be complemented by changes in the way teachers teach and students learn, through the use of experiential and applied learning.

Partnerships with Industry

Partnerships between the business and education communities are also widely recognized as essential to the success of school-to-work transitions, and they are an integral aspect of school modernization.

More than 140,000 business/education partnerships sponsored by industry and foundations have been created during the last decade.[30] More than 40 percent of elementary and secondary schools participated in partnerships, and that figure is expected to rise to 100 percent by the year 2000.[31]

An example of a solid business-education partnership is the relationship established in 1992 between the Cleveland Advanced Manufacturing Program (CAMP), Youth Opportunities Unlimited (YOU), and West Tech High School's Project SMART (School for Manufacturing and Automotive Related Technologies). This partnership, which will serve 300 ninth and tenth graders during the 1993-94 school year, is based on local industry skill standards which drive a four-year curriculum developed by a team of teachers to prepare students for local careers. At the secondary level, West Tech students take classes that conform to industry standards, receive worksite training, and work on projects developed by YOU and Cleveland

State University's Advanced Manufacturing Center, which relate instruction to specific manufacturing-related tasks. Upon high school graduation, students will continue their education at Cuyahoga Community College and other postsecondary institutions, and become eligible for further training at CAMP'S Manufacturing Learning Center. This pathway provides students, teachers, and local employers with an agreed-upon set of outcomes around which the community designs education and training programs.

In Chicago, business-education partnerships are essential to education reform. Total Quality Management techniques have helped schools assess their strengths and weaknesses, redesign operations, improve school management, and implement new teaching and learning systems. Business has also been instrumental in financing local school council elections.

To effect partnerships that link school to the real world, business and education must do more than just communicate and cooperate; they must collaborate and integrate.[32] Business leaders and educators must establish common goals of their partnerships; they must build trust and respect for each other; and they must share power and "accountability for what the partnership plans to accomplish."[33] This accountability will encourage both parties to seek outcomes benefiting both students and employers, resulting in a "win win" situation.

Partnerships must also include frequent exchanges between industry and schools. Business, through local economic development councils, should supply schools with vital information on new technologies, effective management techniques, labor markets, and local economic forecasts. They should also develop tutoring and mentoring programs for local students, as many companies already have.[34]

Partnerships, however, must not focus solely on what business can and should do for schools. Teachers must be just as dedicated to enhancing their own skill levels, expertise, and professional development. They must also actively seek retraining opportunities, such as summer sabbaticals in industry and advanced math and computer coursework.

For its part, the federal government should stimulate the growth of industry-labor-school programs to educate and train technical workers. These cooperative programs should be tailored to meet industry needs and take into account the capabilities of local secondary schools and community colleges. For example, if industry puts up initial funds for local programs, then the government should supply a match. Giving industry a formative role in local programs meeting specific workforce needs would be a much more effective way to increase industry support for worker education and training than would, say, a 1.5 percent pay-roll training tax. Furthermore, market-driven programs require both schools and industry to meet common high-performance standards in order to receive matching public funds.[35]

Partnerships between educational institutions must also continue to develop. With increased federal funds, communities could expand partnerships such as Tech-Prep between secondary schools, community colleges, and universities. The benefits of such partnerships include (1) improved effectiveness of educational institutions, (2) greater responsiveness to the needs and missions of institutions at various levels, (3) smoother transitions for students from one level to another, (4) elimination of duplicative courses or loss of credit, (5) accomplishment of education goals in a shorter time, (6) and the emphasis on continuous learning and greater achievement.[36]

Innovative teaching methods, advanced learning technologies, industry-labor-school partnerships, and Tech-Prep are already established around the country and are helping to improve student responsiveness and performance. Policy makers are reminded to evaluate existing programs, fund only those that show merit, and seek innovation when new programs and services are needed. Leveraging and improving existing programs in this way can be a cost-effective method for preparing technical workers for the new industrial era.

Youth Apprenticeship

An effective school-to-work transition system is as essential to the development of a high skills workforce as is the redesign of secondary high schools themselves. By their very nature, "youth apprenticeships" link education to employment and hold considerable promise for future workers and employers.

Instituting youth apprenticeships refocuses the debate in education on what constitutes successful outcomes for students. Often times, educators measure student success by the amount of time students spend in class. Youth apprenticeships, conversely, offer real work experience and require students to meet industry-recognized skill standards. Competency-driven, youth apprenticeships serve both the needs of students and employers.

To effect a solid school-to-work transition, youth apprenticeships must include three major components:

- clearly defined occupational and educational standards;
- direct and continuous involvement of business and labor; and
- curriculum to complement work-site training.

The essential first step is to establish specific industry-certified skill standards for occupations suitable for apprenticeships. In a few fields, occupational training standards already exist. In fields where they do not, the U.S. Departments of Education and Labor have initiated studies to identify and certify them.

Two equally important areas require standards: academic accomplishment and mastery of "workplace basics." Youth apprenticeships must define the academic competencies required by occupations, and insist upon rigorous teaching and testing to be sure that students' academic achievement equals their skill mastery. Youth apprenticeships must also foster the development of basic, analytical, and personal skills identified in the SCANS report.

Secondly, business and labor must be continuously involved. Businesses should expect to pay youth apprentices on a graduated scale in much the same way traditional apprentices are paid. At the same time, youth apprenticeship agreements must serve the best interest of current employees. If agreements are seen as unfair to either the youth apprentices or to current employees, the programs will not last.

Thirdly, curricula must be developed to complement work-site experience. This requires industry-education-labor participation on youth apprenticeship committees and continuous program evaluation and certification. In addition, teachers and work-site mentors must jointly evaluate youth apprentices to ensure that they are fulfilling both school and work requirements. Teachers and mentors should also develop career exploration activities for high school students (although occupational counseling should begin in elementary school.)

Students in the eleventh grade should be academically prepared to begin their youth apprenticeships. After two years of apprenticeship training, students should possess knowledge of tools and machinery in the occupation; an understanding of materials used and how industry uses them; an understanding of common practices, techniques, customers, and products of the industry; and the ability to apply academic theory to work. By the end of their senior year, they should have achieved sufficient mastery of the occupational skills, academic skills, and workplace basics to (a) be employable; (b) enter a four-year college; (c) begin two more years of advanced training and youth apprenticeship at community colleges, in conjunction with Tech-Prep or associate degree programs; or (d) become apprentices with unions or companies.

There are already about 400,000 adult apprentices who receive company- or union-provided training in more than 40,000 registered apprenticeship programs.[37] These programs should serve as models for youth apprenticeships, which are already being developed by numerous state Departments of Education.

Another youth apprenticeship program, operating on a small scale out of the Bureau of Apprenticeship and Training (BAT) at the Department of Labor, could serve especially well as a model for youth apprenticeships. BAT field agents have worked with employers and schools in nine states to develop school-to-apprenticeship (STA) programs for 2,500 students. STA programs place high school students in part-time apprenticeships in private firms leading up to full-time apprenticeships with the same firms upon high school graduation. The success rate of STA programs is quite high. In Alabama, for example, 206 students during the 1991-1992 school year were enrolled in the STA program and almost 80 percent of them entered full-time apprenticeships with their sponsoring employers upon completion of high school.

Just as this program develops youth apprenticeships through business-education collaboration, the jobs that students already have—and for which employers are already paying—could also serve as a foundation for a youth apprenticeship system. Recognizing that about half of high school students and over half of community college students already have part-time jobs, federal funds could be used to develop school- and work-based programs designed by employers, store managers, and teachers. This would provide an automatic link between business and education.

SECTION 6

Federal Involvement

"As federal policy makers draft legislation to foster a high-skills, productive workforce —which is indeed becoming more diverse — they should focus on developing effective technical education programs in all school districts, urban and rural, well-funded and under-funded."

Overview of Federal Involvement in Technical Education

Throughout the century, support for vocational-technical education has surged in response to the nation's economic needs, and that support is again appearing in various pieces of proposed legislation of which the purpose is to develop programs to foster a globally competitive workforce.

The formal vocational-technical education movement began in the United States in 1906 with the founding of the National Society for the Promotion of Industrial Education. Business, labor and education leaders who helped form the Society realized that the industrial expansion occurring at the turn of the century required a skilled workforce—as we realize today. In 1917, Congress passed the Smith-Hughes Act, which allocated $7.2 million to states to establish vocational education programs. Half of the money went toward the salaries and training of vocational-technical education teachers in urban areas, while the other half went toward teachers of agricultural education in rural districts.

Federal funding for vocational programs in specific employment categories continued to grow through the 1940s. At the end of World War II, the federal government was spending $29 million a year on vocational programs.

The 1962 Manpower Development Training Act (MDTA) and the 1963 Vocational Education Act (VEA) were also passed to ensure that education met demands imposed by the changing economy. MDTA funds went toward worker retraining programs in community and technical colleges. VEA funds were distributed as block grants to states, which then designed education programs according to the skill needs of the marketplace.

During the Great Society effort, the thrust of federal investment in vocational education changed from preparing students for work to addressing the economic and social needs of the disabled and disadvantaged. While this is not to be criticized, the result is that most federal support for vocational-technical education has been restricted to meeting the needs of these groups. This places a stigma on vocational-technical programs. Ideally, schools in all districts should be positioned to provide *quality* technical education to *all* sectors of the population.

In a recently released report, "A Training Program for the 1990s," work force development Professors Sar Levitan of George Washington University, Garth Mangum of the University of Utah, and Stephen Mangum of Ohio State University argue that technical training must be targeted to all groups:

> "Training policy must expand its focus beyond the economically disadvantaged and displaced while not abandoning those concerns. The focus of federal training policy on low income groups over the past three decades has produced the perception that the employment and training system is an extension of the welfare system. Remedial education and training for the economically disadvantaged is a critical need but it is only one essential component of a broader system."

As federal policy makers draft legislation to foster a high-skills, productive workforce—which is indeed becoming more diverse—they should focus on developing effective technical education programs in *all* school districts, urban and rural, well-funded and under-funded. Enabling the school system to serve all groups will diminish the need for second chance programs that are often criticized for:

- Emphasizing remediation rather than prevention;
- Creating difficulty for employers when assessing skills of participants because skill standards are not defined;

- Necessitating extraneous bureaucracies;
- High costs and redundant services.

Strong, federally supported programs for at-risk populations are clearly needed. We would argue for even more funding of non-duplicative and cost-effective programs for these groups, but they should be more integrated into the existing school system. At the same time, the federal government should enact education policies and programs in the nation's schools that reach the entire population and which foster the development of a highly skilled workforce, the cornerstone of global competitiveness.

Federal support for both of these goals will require significant funding. Yet, as the next chapter explains, federal funding for technical education is woefully inadequate.

"Only a small fraction of the total federal education budget is directed at technical programs that will lead to a high-skills workforce."

SECTION 7

How Federal Funds Are Now Invested

How Federal Funds Are Now Invested

Technical education for a high-skills workforce represents a very small fraction of the total federal education budget. Figure 1 shows that federal outlays for education in FY 93 totalled $68.4 billion and were spread across 11 federal agencies. In appropriation terms:

- Only $6.5 billion was directed in FY 93 to technical education and job training programs through the Education, Labor and Health and Human Services Departments (Fig. 2).

- Of that $6.5 billion, only $1.2 billion, appropriated through the Perkins Act, went toward vocational-technical education in the nation's schools.

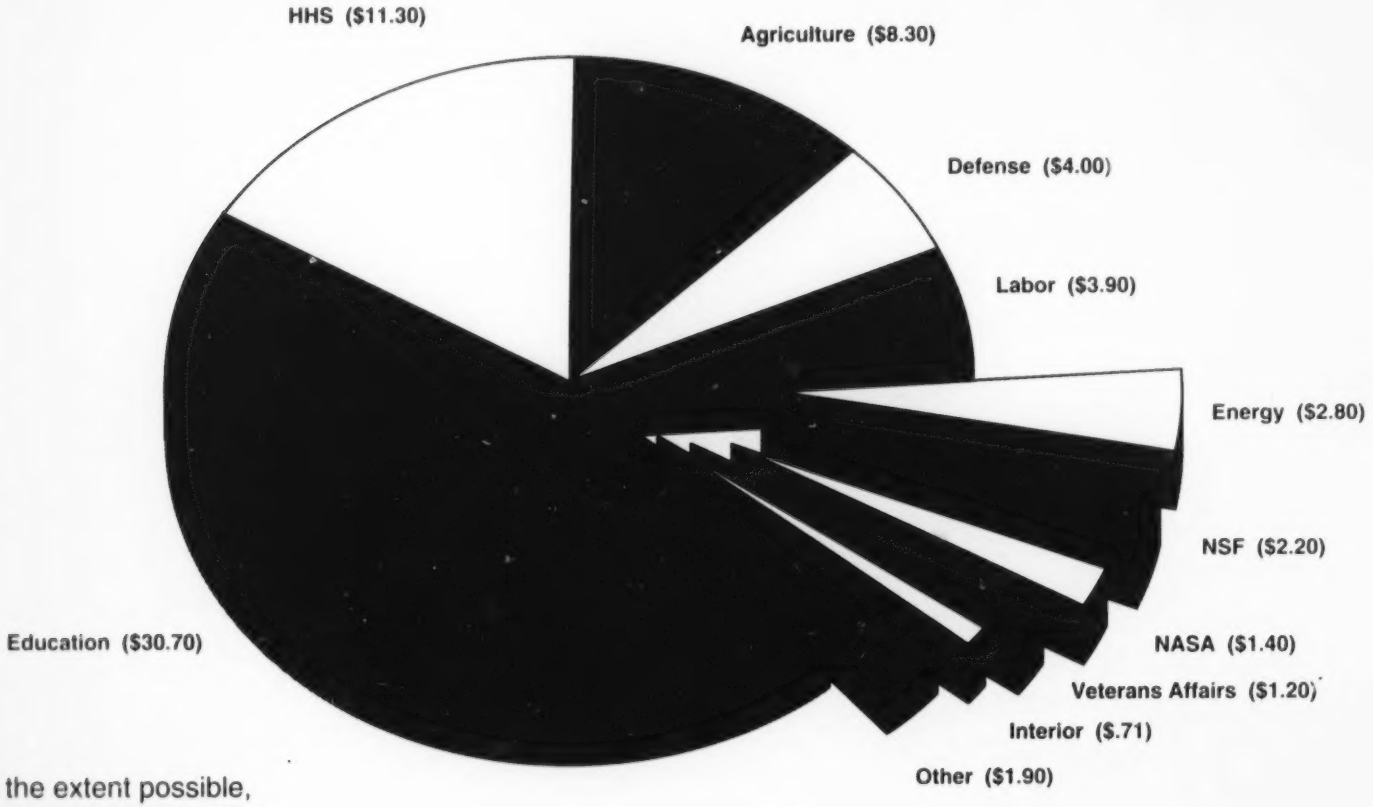
- Of this $1.2 billion, only $104 million went to the largely successful and cost-effective Tech-Prep program.

Although outlays are often made over multiple years, there is a highly significant difference between those amounts that are appropriated from year to year for technical education and total federal education outlays. The small allocation for technical education is part of a long-term trend. For example, federal outlays for vocational and adult education decreased in constant FY 93 dollars by $200 million from FY 80 to FY 93 (Fig. 3). All other programs administered under the Perkins Act have been level-funded pending their evaluation.

It is encouraging that the Clinton Administration is giving higher priority to school-to-work transition programs, especially for youth apprenticeships. The Departments of Education and Labor are each expected to receive $135 million in FY 94 to develop youth apprenticeship programs. In addition, the President's long-term reinvestment plan envisions $1.2 billion over four years for youth apprenticeships.

Nevertheless, even if the Administration allocates this full $1.2 billion to youth apprenticeships, this does not substantially change the overall distribution of federal education funds.

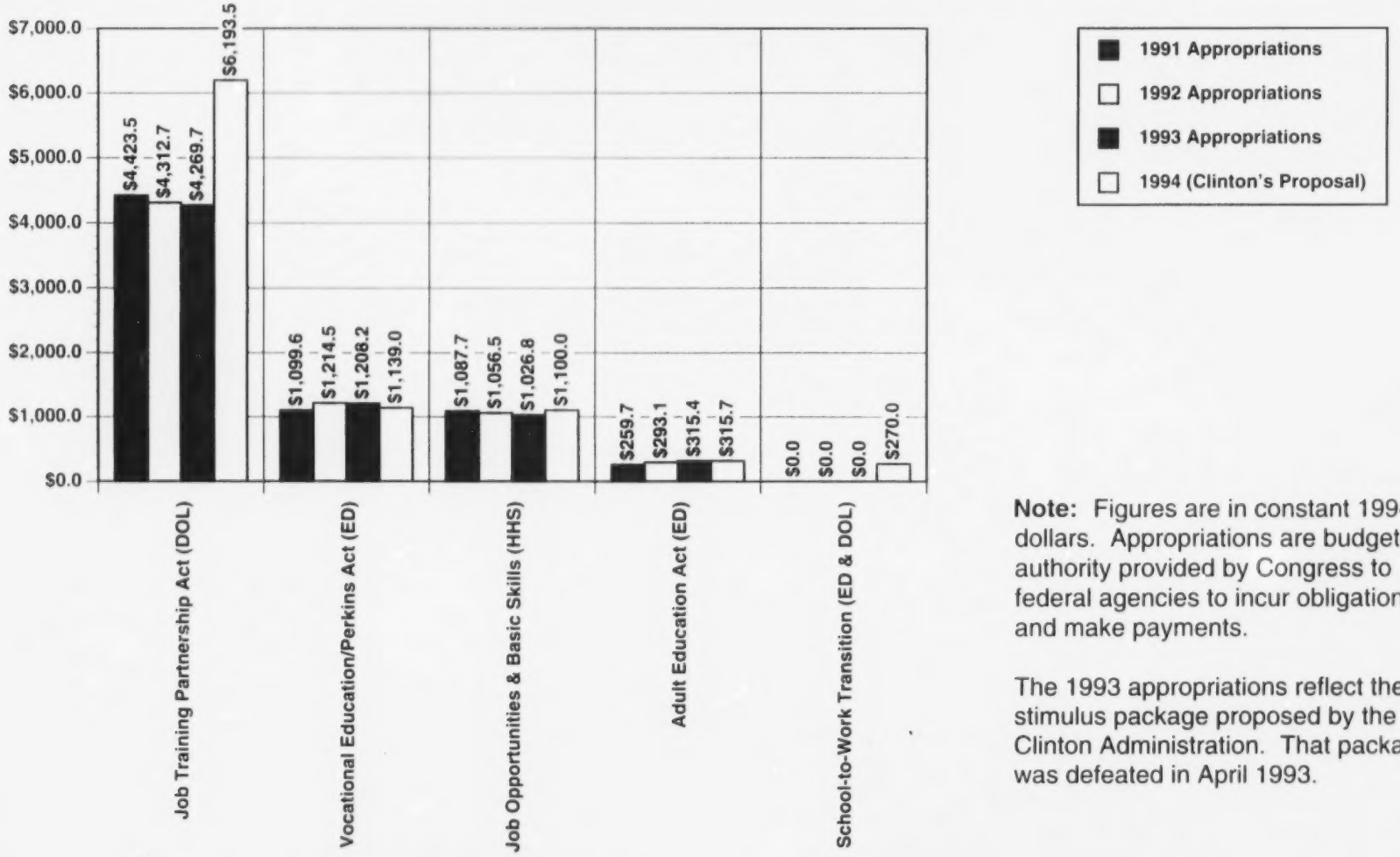
Figure 1
Largest Providers of Federal Education Program Funding FY 1993
in billions of dollars



Note: To the extent possible, figures represent outlays rather than appropriations. The figures total $68.4 billion.

Source: U.S. Department of Education, National Center for Education Statistics, April 1993.

Figure 2
Federal Funding for Technical and Adult Education and Job Training Programs in millions of dollars

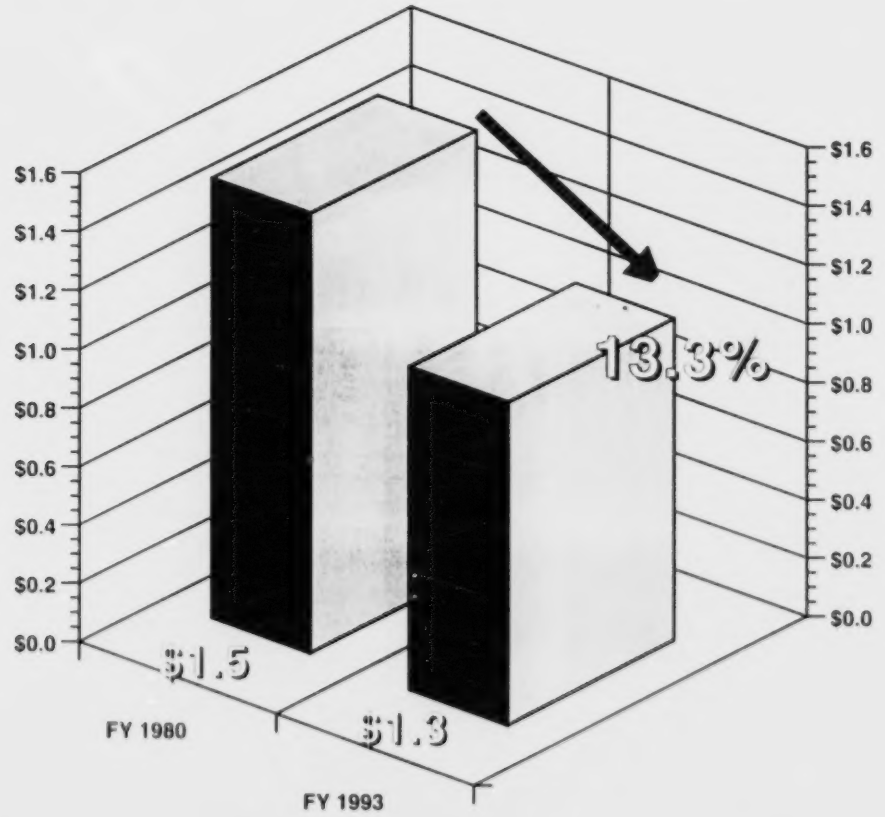


Note: Figures are in constant 1994 dollars. Appropriations are budget authority provided by Congress to federal agencies to incur obligations and make payments.

The 1993 appropriations reflect the stimulus package proposed by the Clinton Administration. That package was defeated in April 1993.

Sources: ***Vocational Training News*****, p. 4, April 15, 1993; U.S. Departments of Labor, Education, and Health and Human Services; and the Office of Management and Budget.**

Figure 3
Federal Outlays for Vocational and Adult Education in billions of dollars



Note: Figures are in constant 1993 dollars. Outlays are the actual dollars spent by federal agencies to make payments and liquidate obligations.

Sources: U.S. Dept. of Education, National Center for Education Statistics; the Office of Management and Budget, June 1993.

SECTION 8

Time for a Fundamental Federal Policy Shift

"To its credit, the Clinton Administration has begun to effect this shift, but it is not going far enough."

Time for a Fundamental Federal Policy Shift

Major improvements in the ability of technical educators in schools to meet the competitiveness needs of industry will not occur without a fundamental shift in the education policies and priorities of the federal government. To its credit, the Clinton Administration has begun to effect this shift, but it is not going far enough. To meet the needs of industry for a technically trained workforce, the federal government should take bolder measures of the kind recommended below.

Change Priorities

1. Realize that investment in America's human resources is the key to our nation's increased productivity and competitiveness. The federal government should therefore serve as catalyst toward policies that link education to the skill needs of industry.

The Administration and the Congress should make an explicit policy pronouncement embedded in relevant legislation that global economic competitiveness and quality technical education will become the principal drivers of federal education policy.

2. Increase annual federal funding for technical education programs from $1.2 billion in FY 93 to $6 billion and for youth job training programs from $5.2 billion in FY 93 to $6 billion over the next four years. Traditionally, funding for training programs has been targeted to the disadvantaged, which has stigmatized programs and created a "tracking system" whereby the disadvantaged are the only eligible candidates for federally supported training programs. A more even distribution of funds for technical education and youth job training programs among the general population will reduce tracking and will lend more credence to federal workforce development policies. Federal funding for vocational-technical education will also leverage industry, foundation, and state and local government support for improving technical education in schools. This additional funding should be drawn from the reinvestment in education and training envisioned in President Clinton's economic plan.

Strengthen Partnerships with Industry

1. Award joint proposals submitted to state governments from committees of industry representatives, labor leaders, and educators for cooperative efforts that will serve workforce development needs. The drafting of such proposals will require consensus among all three groups on how best to link education to market demands and will therefore help to ensure the development of comprehensive school-to-work transition programs.

Funding of the Business-Labor-Education Partnership under the Perkins Act would assist in this undertaking. However, a separate bill with more sufficient funding and applicable to all segments of the population will be needed.

2. Provide incentives for industry participation by supplying a federal match to industry contributions for such joint proposals. Encouraging industry to put up initial funds for local projects will lead to the creation of market-driven systems, which in turn will drive improvements in education, as students and teachers will need to meet optimum performance levels. To ensure the success of market-driven education and training programs, local economic development councils should inform schools about economic and employment trends so that teachers and students remain in touch with developments in the business community.

3. Provide tax incentives to businesses to encourage their involvement in education, by, for example, donating

equipment to schools or leasing it at below market rates; training teachers; or offering paid, on-site apprenticeships to students.

4. Appropriate $500 million between FY 94 and FY 97 for upgrading facilities and equipment, $100 million of which is already authorized under the Perkins Act.

5. Direct state panels of employers and technical committees to review their 1990 assessments of industry workforce requirements and make appropriate curricula changes. Industry and technical educators should also work collaboratively to project future skill needs based on emerging technologies.

6. Include industry representatives, labor leaders, students, and secondary and postsecondary school teachers/administrators on new and existing advisory councils at both federal and state government levels.

7. Build more support in secondary schools and community colleges for programs such as Tech-Prep that specialize in training students for manufacturing and technically advanced service industries. This requires active student recruiting and program publicity. Funding for Tech-Prep should increase to $250 million in FY 94 $1 billion by FY 97.

8. Solicit industry support of hiring preferences for students who have successfully completed their training through rigorous school-to-work transition programs.

9. To improve their responsiveness to the needs of industry, educators should:

a. develop long-term relationships with business.

b. meet frequently with business and labor leaders for student orientation and teacher retraining; and to discuss mutual use of total quality management techniques, school performance, changes in skill requirements, and other issues affecting the business-labor-school community.

c. offer "school-to-work" sabbaticals to teachers and guidance counselors in the private sector to expose them to new technologies and changing workforce demands.

d. seek technical assistance from the employer community.

e. continue to develop skill standards and achievement goals for students and teachers.

f. practice industry's guidelines on total quality management to modernize school facilities, equipment, academic programs, and management practices at state and local levels.

g. improve data collection on schools and job placement rates.

Foster Continuous Quality Improvements in Technical Education

1. Develop comprehensive curricula, combining high-level academic courses with technical instruction, using advanced learning technologies, and encouraging active student participation. To keep curricula relevant to the workplace, modern comprehensive schools should operate under desired learner outcomes and rely on business-labor-education and secondary-postsecondary school partnerships, such as Tech-Prep.

2. Sustain federal support for the industry-led effort, currently supported by both the U.S. Department of Education and the U.S. Department of Labor, to create voluntary national skill standards for key industrial occupations in support of which the vocational-technical education community can develop curricula.

3. Grant certificates and diplomas to students as proof of skills mastery and entry-level qualifications.

4. Strengthen state-level capacity to provide technical and curriculum assistance, professional development programs for teachers, student mentoring and counseling services, and standards and performance measures to localities—without stifling local initiative—through program improvement grants. State leadership activities should also be funded to oversee the implementation of these program improvements in *all* school districts.

5. Broaden the use of applied academic programs and advanced learning technologies, such as computer-based, interactive and multimedia learning systems.

6. Improve the quality of instruction and counseling related to technical education by emphasizing occupational education and applied learning methods in teacher preparation courses.

7. Offer incentives to qualified military technical experts leaving the service to teach in secondary and postsecondary institutions. Encourage schools to recognize their credentials.

Ease School-to-Work Transition

1. Enhance work-based education through partnerships between industry and secondary and postsecondary schools.

2. Fund school- and work-based programs at the level proposed by the President ($270 million in FY 94 and $1.2 billion over four years).

3. Fund the federal portion of youth apprenticeship programs at the level proposed by the President ($1.2 billion over four years), drawing upon labor's experience in the development of these programs. Youth apprenticeships must follow guidelines set by industry and labor, and provide school-based curricula to complement work-site training.

4. Establish clearly defined educational and occupational standards for school- and work-based learning to ensure that programs meet both student and employer needs.

5. Recognizing that about half of high school students and over half of community college students already have part-time jobs, develop standards and certificates for their work to incorporate it into a comprehensive school- and work-based learning experience. Work with employers and schools to organize these jobs to meet accreditation requirements. This would provide an automatic link between business and education, at little additional cost to either business or government.

6. Promote school-to-work programs that involve both a paid and graded learning experience.

7. Grant certificates of mastery in addition to diplomas to graduating high school seniors who have successfully completed youth apprenticeship programs.

Strengthen Both First and Second Chance Programs for the Disadvantaged

1. Improve the quality of instruction and facilities in inner-city and rural technical schools.

2. Promote accountability within the public school system to ensure that all students preparing for technical careers meet skill levels needed by industry. Quality education programs relevant to real work experience will discourage students from dropping out and will therefore lessen the need for costly second chance programs outside the public school system.

3. Strengthen "second chance" programs for drop outs to enable them to develop skills needed for employment in industry.

4. Provide for a closer integration between these second chance systems and the "first chance" school system to ensure that programs inside and outside of schools are equally competency-driven.

Recognize Achievement and Bolster Student Organizations

1. Raise the prestige and profile, up to the Presidential level, of awards and recognitions for student and teacher achievement in vocational technical education.

2. Provide stronger national support for the U.S. team at the International Skills Olympics.

3. Strengthen vocational student organizations, student-employer relationships, and outreach activities.

4. Encourage all vocational-technical education students to join vocational student organizations, such as the Vocational Industrial Clubs of American (VICA), which develop employability and leadership skills.

ENDNOTES

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